



UNITED STATES PATENT AND TRADEMARK OFFICE

Dev
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,651	08/07/2003	Chia-Tien Peng	10958-US-PA	1650
31561	7590	08/24/2006	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE			GHYKA, ALEXANDER G	
7 FLOOR-1, NO. 100			ART UNIT	PAPER NUMBER
ROOSEVELT ROAD, SECTION 2			2812	
TAIPEI, 100				
TAIWAN				
DATE MAILED: 08/24/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/604,651	PENG ET AL.
	Examiner Alexander G. Ghyka	Art Unit 2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-28 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

ALEXANDER GHYKA
PRIMARY EXAMINER

AV2812
Alt. 

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some *
 - c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Applicants' response of 6/09/06 has been considered and entered in the record. Claims 40-41 have been cancelled. Claims 1-28 are now under consideration. The rejection under 35 USC 112 is withdrawn in view of Applicants' amendments. With respect to the rejections under 35 USC 102 and 103, Applicants' arguments have been considered but they are not persuasive for the reasons as discussed below. Applicants are correct in stating that Claim 12 should be rejected under 35 USC 103, and the appropriate correction has been made.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 20-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Takayama et al (US 6,610,142) for the reasons as discussed in the previous Office action.

The present claims generally require forming an amorphous silicon layer over a substrate, performing a plasma treatment, transforming the amorphous silicon layer into a polysilicon layer by laser annealing, patterning the polysilicon layer to form a plurality

of island polysilicon layers, forming a channel region and a doped source/drain region on each side of the channel region and forming a gate over each channel region.

Takayama et al disclose forming a silicon oxide film, a plasma treatment, the formation of an amorphous silicon film, and its subsequent crystallization by laser annealing. See Example 1, column 6, lines 40-65. Takayama et al disclose nitrogen and oxygen containing plasmas (column 5, lines 25-35). Moreover, Takayama et al discloses the formation of a channel region, source/drain region and gate in the formation of a TFT transistor as required by the present claims. See Example 4, lines 1-60. Even though, Takayama disclose an additional silicon oxide film, the aforementioned claim limitations are anticipated as the present Claim language does not exclude the additional silicon oxide layer. Takayama discloses that “ nucleation sites are controlled by selectively exposing the amorphous silicon film to a plasma”. See the Abstract, second to last sentence. Therefore, Claims 1 and 20-29 are anticipated.

Response to Applicants' Arguments

Applicants argue that Takayama does not teach each and every element in the claims, and more specifically “wherein the plasma treatment comprises applying an oxygen containing plasma or applying a hydrogen containing plasma” as required by the present Claims. The Examiner has stated that Takayama discloses that “ nucleation sites are controlled by selectively exposing the amorphous silicon film to a plasma”. See the Abstract, second to last sentence. Applicants argue that the description of the Abstract of Takayama is incompatible with its detailed description of the invention and

cite five examples. Applicants argue that all of the examples and the description in the detailed description of the invention in the citation teach the plasma treatment is performed to the insulator layer or oxide film base and then the amorphous layer is deposited, and therefore Takayama fails to disclose the step of performing a plasma treatment to the amorphous layer in the whole description of the invention. Applicants propose that the Abstract is merely a typo. The Examiner maintains that a reference is not limited to its examples, and is relied upon for what it conveys. In the present case the Abstract clearly states that “nucleation sites are controlled by selectively exposing the amorphous silicon film to a plasma”, and this information is clearly conveyed.

The Examiner has no way to determine what the reference meant to say, but merely relies on what the reference clearly states.

The Examiner notes that on column 5, lines 20-30, Takayama et al discloses “Furthermore, the crystallization occurs more easily by heating the substrate to a temperature range of from 100 to 500 degrees Celcius during the plasma treatment, and more specifically the substrate is heated to a temperature of 200 degrees or higher. This is because the catalytic substances can be more readily obtained at higher temperatures.” The Examiner maintains that Takayama et al reference is referring to the crystallization of the amorphous layer by plasma and catalysts to form polysilicon. The Takayama reference further states that “best results on plasma treatment can be obtained by generating the plasma in an atmosphere..” containing oxygen or hydrogen among the listed gases. Clearly Takayama anticipates the phrase “performing a plasma treatment to the amorphous silicon layer, where the plasma comprises applying an

oxygen-containing plasma or applying a hydrogen containing plasma". In the present case, as all of the limitations of the afore mentioned claims are met, the rejection under 35 USC 102 is proper.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., plasma no used for crystallization) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Therefore, the rejection under 35 USC 102 is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-12 and 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takayama et al (US 6,610,142) in view of Jen et al (JJAP Part 2: Letters 1991, 33 (7B), L997-L979) and Luan et al (Jour. Of Appl. Phys. 1990, 68(7), 3445-3450) for the reasons as discussed in the previous Office action.

Takayama et al is relied upon as discussed above.

However, Takayama et al do not disclose an ammonia plasma which results in a positive shift of the threshold voltage of the TFT or a nitrous oxide plasma which results in a negative shift threshold voltage.

Jen discloses the formation of a thin film transistor, wherein a nitrous oxide plasma results in a smaller or negative shift of the threshold voltage of 0.5V. See the Abstract.

Luan et al disclose the formation of thin film transistors and the effect of NH₃ plasma in increasing or positive shift in threshold voltage. See the Abstract and p. 3447, section B.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, that the nitrogen and/or oxygen containing plasma of Takayama et al can be used to adjust the threshold voltage in negative or positive shifts in light of the disclosure of Jen that ammonia plasma results in a positive shift of threshold voltage and the disclosure of Luan et al that nitrous oxide results in a negative shift. A *prima facie* case of obviousness is established, as all of the references pertain to thin film transistors and the use of plasma for the benefit of adjusting the threshold voltage as disclosed in the prior art would be readily apparent to one of ordinary skill in the art.

Response to Applicants' Arguments

Applicants' argue, with respect to both rejections, that Takayama fails to disclose that a plasma treatment is performed to the amorphous silicon layer. Applicants' argue that in Takayama the plasma treatment is performed to a silicon

oxide layer but not to the amorphous silicon layer. The Examiner maintains that Takayama discloses two plasma treatments, one of which is to the amorphous silicon film, as discussed with respect to the rejection under 35 USC 102. With respect to the Jen and Luan reference, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Therefore, the rejection under 35 USC 103 is maintained.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday through Thursday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873 . The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGG
August 16, 2006

ALEXANDER GHYKA
PRIMARY EXAMINER

Av 2812
Aly Ghyka